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*V. On a newly discovered genus of Serpentiform Fishes. By
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Read February 1, 1827.

IN no department of natural history have descriptions been more unsatisfactory than such as relate to certain productions of the ocean, which, either from the immeasurable depths that conceal them, or the absence of those circumstances best adapted to their multiplication, very rarely present themselves to our notice, and from this rarity often excite impressions on our minds, ascribing to them properties foreign to their real natures, and at variance with that harmony which, even in the deepest recesses of the ocean, pervades the works of Omnipotence.

It is doubtless from a want of more frequent opportunities for investigation, that the ancients were induced to consider the sea as the abode of monsters and prodigies of the most incongruous characters; for, in addition to their prevailing opinion expressed in Pliny, “ut quidquid nascatur in parte naturæ ullâ, et in mare esse; præterque multa quæ nusquam alibi,” we know that tritons, sirens, mermaids, and more lately krakens, and serpents of vast proportions, and varied properties, have been the frequent subjects of serious consideration; and even in the present day there are perhaps few whose imaginations, at some period of their lives, have not

been highly interested by the contemplation of such ideal beings. As the difficulty therefore of eradicating error from the mind, when once received, imparts value to truth, though least adorned, on this ground I would presume to present to the attention of the Royal Society an account of a newly discovered, and a very extraordinary marine animal. Last autumn, whilst Captain SAWYER, of the ship Harmony, of Hull, was in pursuit of the bottle-nosed porpoise, in latitude 62° north, by about 57° west, he observed a body floating on the surface of the water, which was at first mistaken by himself and his seamen for an inflated seal's skin, such as the Esquimaux employ in the destruction of large aquatic animals, by attaching it to the harpoon by which they are speared, and thus tiring them out by its floating property. On a nearer approach however, the object which had excited their attention proved to be a living marine animal. The creature is still in the possession of Captain SAWYER, who preserved it in rum soon after being taken, and who obligingly afforded me an opportunity of examining it. Its capture was occasioned by its being, when first observed, almost worn out by unavailing efforts to gorge a fish of about seven inches in circumference, with which it appeared to have been long contending, as it exhibited very feeble signs of life. Its organs of motion being extremely small, and its body greatly elongated, this creature would, on a cursory view, be by all considered as an extraordinary kind of sea serpent—a tribe of animals concerning which so much equivocal matter has been written; and this idea would be even supported by a more close examination of some parts of its structure. The fact, that the sea contained animals nearly allied in form to

serpents, has been remarked in the earliest ages ; ARISTOTLE has expressly stated, that there are many species of sea serpents, among which tribe he evidently includes the branchial apodes, for he has particularized one of these as par excellence the Οφις Θαλαττιος. This is the muræna serpens of LINNÆUS, or the ophisurus of LACEPÈDE, a creature of a more cylindrical form than the eel, and possessing other points of resemblance to the snake tribe ; but although, in the present day, the term sea serpent would be ill applied to any animal which breathes by means of branchiæ, yet among such creatures, excluding the genera hydrus and hydrophis, and other true water snakes which inhabit tropical seas, I doubt if the subject of this communication be not at least as well entitled to that appellation as any hitherto described. From the several genera of animals however nearest allied to it, it offers points of disagreement so important, as to entitle it to a distinct place in classification, and especially from the formation of the jaws, which, with the exception of the apparent want of serpentiform inter-articular bones, are truly analogous to those of snakes ; and, secondly, from the possession of an enormous elastic sac, which is seemingly a receptacle for air only. The first of these latter characters appearing to be the one, of all least liable to vary, I would suggest the term Ophiognathus as applicable to the genus ; its characters are as follow :

OPHIognathus. Corpus nudum, lubricum, colubriforme, compressum, sacco ampio abdominali.

Caput anticè depresso, maxillâ superiore (paulo) longiore.

Dentes, in maxillâ inferiore, et ossibus intermaxillaribus, subulati, retroflexi.

Maxillæ elongatae, patulae, dilatabiles, (serpentium instar).

Lingua vix conspicua.

Spiracula ante et sub pinnas pectorales, magna.

Pinnæ pectorales, dorsales, analesque radiis mollibus; ventrales nullæ.

Oculi minimi, prope extremitatem maxillæ superioris positi.

Cauda elongata, in filamentum apterum producta.

As a genus, then, the association of the above characters distinguishes this creature from any others which I am aware have hitherto been described, although some of them may be met with in those genera nearest allied to it, as the muræna, ophisurus, gymnothorax, sphagebranchus, synbranchus, gymnotus, ophidium, gymnetrus, and trichiurus. In these however we find the following points of dissimilitude. In muræna the fins are adipose; ophisurus has teeth on the ossa palati, and gymnothorax has no pinnæ pectorales. In sphagebranchus the same fins are also absent, or imperfect, and the snout lengthened. In synbranchus the spiraculum is single; in gymnotus the dorsal fin is wanting. The genus ophidium has open branchiæ and large opercula; in gymnetrus the anal fin is deficient; and lastly, in addition to other important differences, this is supplied in the trichiurus by a dentated edge.

We now proceed to consider the only known species of Ophiognathus, which, from a character altogether anomalous among apodal fishes, we shall term *ampullaceus*.

Its body is one uniform purplish black, except the filamentous extremity of the tail, which is much lighter. The total length of the specimen taken is 4 feet 6 inches. The enlarged and extremely elastic pharynx communicates with the enor-

mous sac or air vessel, which extends in length from the extremity of the snout about 20 inches. The great delicacy of the parietes of this sac, and its apparent liability to rupture from the action of the spirit, prevented my inflating it to its full extent; but when partially filled with air, it measured about 9 inches in circumference below its union with the tail, and its greatest diameter, including the slender body to which it pertained, was 4 inches. At about one inch below the last point of its attachment with the body, the rectum was observed to perforate the sac, the tenuity of which rendered the course of that intestine, as indeed that of all the digestive organs readily traced. They are apparently sustained beneath the ribs (which latter appear very imperfect), by a membranous expansion, as they are not affected in their position by any inflation or emptying of the sac. That the sac itself communicates with the pharynx, is sufficiently proved by the fact, that if the blowpipe were further introduced, the digestive organs were alone inflated, the sac undergoing no change in its dimensions. The nearest point of analogy therefore to this structure observable in the class Pisces, is seen among the diodons and tetraodons, where a kind of ingluvies, or crop, formed of a very thin and extensible membrane, adheres closely to the peritonæum throughout the whole extent of the abdomen, by means of which their curious and rapid power of inflation has long excited surprise, though we cannot in the smooth *Ophiognathus* so satisfactorily account for its use, as among these fishes, which by its distention, mechanically elevate their spines, and thus float about in safety. This external sac might again be compared with the more internal air vesicle of most other kinds of fishes, and especially that

of the sturgeon kind, which has so large and free a communication with the oesophagus ; but in extending our enquiries on this subject further, we find no class among the vertebral animals which does not offer some modification of a similar structure ; for even among the mammalia, the whales, which are called the balænæ boops and rostrata, also the balæna musculus, if it be a distinct species, have the anterior part of the body covered with an extremely elastic skin, plaited into deep folds, as Mr. HUNTER has expressed it, " like unto a ribbed stocking," and capable of a vast extent of dilatation. This is partly exhibited in the act of swallowing food, and appears reasonably intended, by communicating with the external air, to render the body so specifically light, as to enable them to sleep with greater ease upon the surface. Of this communication however, that accurate observer, Mr. HUNTER, has taken no notice, but adds, " why the skin should be so elastic, is difficult to say, as it covers the thorax, which can never be increased in size ; yet there must be some peculiar circumstance in the economy of the species requiring this structure, which we as yet know nothing of." Among birds, several examples occur of the possession of external air vessels of considerable size, which in like manner appear to be intended to more perfectly increase or diminish their specific gravity at their will. Of this structure the gigantic stork, *ardea argala LIN.* presents a striking example. Lastly, among reptiles, such mechanical aids, either internal or external, are far more numerous, for to this end we must consider the large internal vesicle forming an appendage to the lungs of turtles ; and probably to the same end is the saccular and membranous inferior half of the lung in snakes, which is at

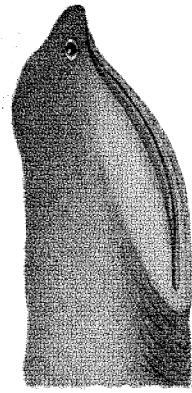
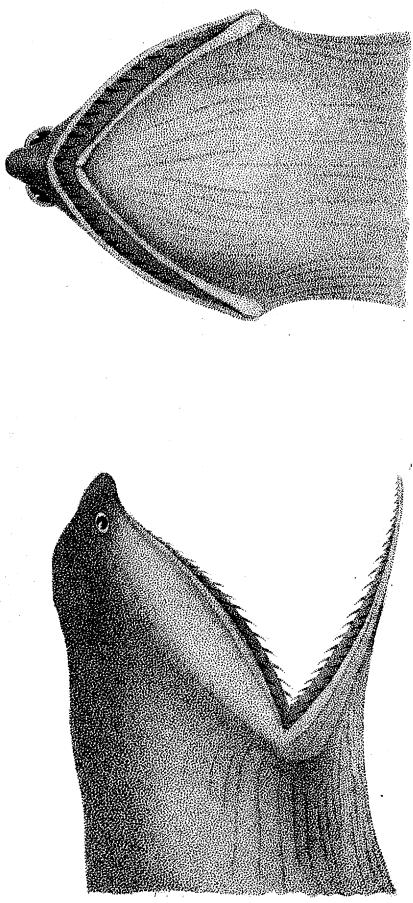
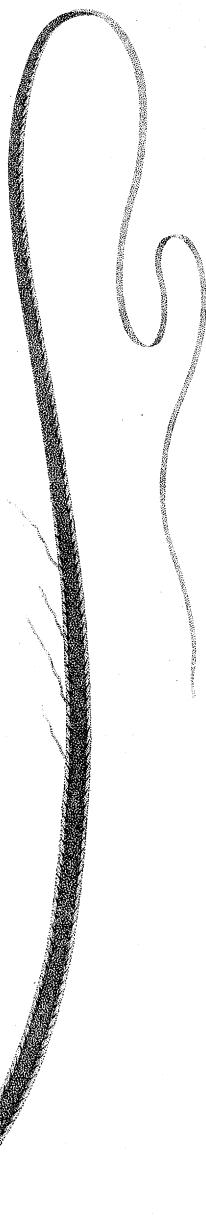
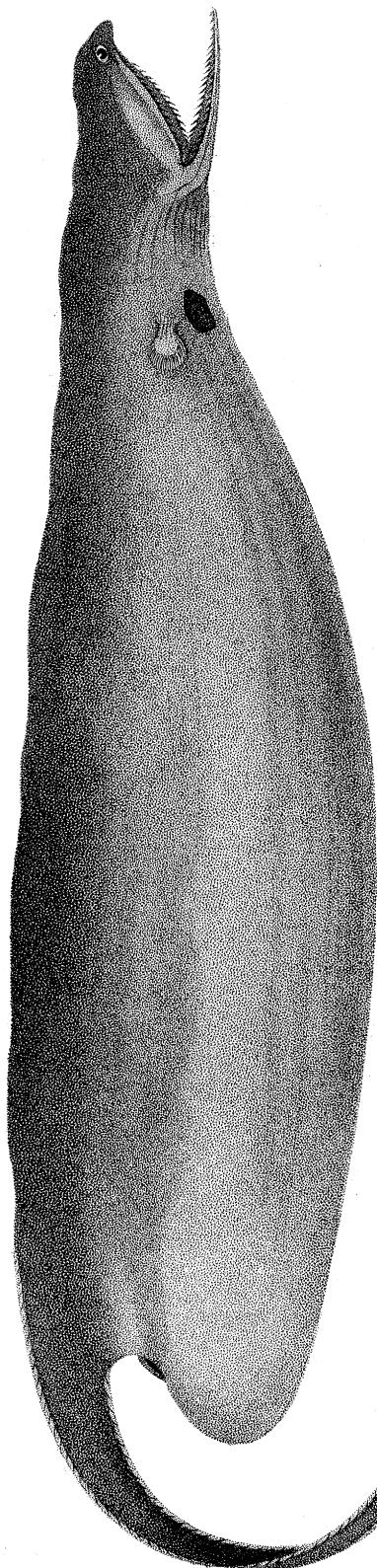
the same time transparent, and exhibits few traces of vascularity. To these might also be added many other instances ; even among the lizards of the genus *anolis*, the *lacertæ strumosa* and *bullaris*, have beneath the anterior part of the body and throat, large elastic vesicles, which at will they quickly distend with air, though these species are not aquatic in their habits. But to return : the skin all over the body of the *Ophiognathus* is particularly soft and slimy, yet it has a slightly granulated appearance. The spiracula are of large size, of an irregular oval form, and are unprovided with externally perceptible branchiostegous rays ; their edges partially conceal on each side three branchiæ. When the sac is contracted, these apertures are placed almost under the body, as in the *sphagebranchus*, having a narrow commissure between them ; they are placed at about $5\frac{1}{2}$ inches from the snout.

All the fins of the *Ophiognathus* are extremely small ; in the formation of the pectorals there is a peculiarity not mentioned, I believe, in other apodal genera, they being principally composed of an adipose disk, which is terminated, and nearly surrounded by a narrow radiated membrane, instead of this latter taking its origin immediately from the body. The dorsal fin, which like the rest is very narrow, and provided with simple rays, commences at about 18 inches from the snout, and terminates insensibly upon that slender, tape-like filament, into which the tail becomes converted, and which is continued $20\frac{1}{2}$ inches in length beyond the posterior extremity of the dorsal fin. About this part of the dorsal fin a few other minute filaments take their growth from it. The anal fin commences at the posterior union of the sac with the body, and ends at about 14 inches from the extremity of the

caudal filament. The body exhibits no apparent lateral line; but perhaps the most curious structures which the creature presents to our notice, are connected with the head and jaws. The almost entire absence of a tongue, might perhaps prove one of its most characteristic distinctions, were we as yet sufficiently acquainted with the condition of this organ in those nearest allied to it. The teeth are disposed in a single row above and below; above, they exist only along the margins of the intermaxillary bones; below, they extend almost the whole length of the maxilla; but the ossa palati are entirely destitute of teeth. Lastly, the jaw-bones are so long, and their articulation is such, that their capability of expansion exceeds what I have seen in any other animal, the rattlesnake not excepted; and as in snakes, when fully distended, the edges of the jaws describe a large circle, and then appear but as the hemming of an ample sack, the pharynx, which usually occupies so small a space, being an equal participant in this extensile property. When the jaws were gently opened, they measured $2\frac{1}{2}$ inches across, and $3\frac{1}{2}$ inches from the front teeth above to those below; but while they possess this capability of distension, their contractile power is no less remarkable, as may be observed in Plate VII. fig. 1. which represents the usual appearance. Fig. 2. exhibits the jaws and pharynx more depressed and extended. Fig. 3. represents an anterior view of the same.

Thus provided then, we find the Ophiognathus to be one of the most predatory and voracious of all the belligerent inhabitants of the ocean, as was proved by the efforts of Captain SAWYER's specimen to gorge a species of perch of more than its own usual circumference, in striving with which, as before

Ophiognathus ampullaceus.



3.

2.

1.

observed, it appears to have lost all its muscular energy. Its entire form would indicate great swiftness of motion, which is doubtless effected by means of the same interesting sinuous inflections in the water, which excite our admiration in the class of serpents upon land ; as it is indeed well ascertained, that some serpentiform fishes, especially the true murænæ, are capable of transferring with great effect, their aquatic locomotive powers to the surface of the earth. In what manner its enormous pouch is employed in its economy, I repeat, that I cannot presume to determine ; its complete inflation with air, when on the surface, must, it would appear, afford a very effectual obstacle to the descent of the animal beneath. Whether it be capable of secreting the contained air, as has been thought of the common internal air vesicles of some other fishes, for which apparent purpose, eels have a peculiar gland connected with its centre, or whether water be allowed to enter its cavity, as it has been thought to enter the abdominal cavity of some rays, would form a subject of interesting enquiry. Having however entered on the field of conjecture, I shall not presume to longer engage the attention of the Royal Society, though I cannot but express a hope, that the discovery of another curious link in the vast chain of being, and especially in latitudes where such an one might have been least expected, will be considered sufficiently important to merit their notice.

Royal Institution, Jan. 10, 1827.